



SEQUENCE LISTING

<110> Fit Biotech Oyj

<120> Novel selection system

<130> PD53649US01

<140> US10/531,870

<141>

<160> 34

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 780

<212> DNA

<213> Escherichia coli

<400> 1

```
gtttcggtttg attggctgtg gttttataca gtcattactg cccgtaatat gccttcgcgc 60
catgcttacg cagatagtgt ttatccagca gcgtttgctg catatccggt aactgcggcg 120
ctaactgacg gcagaatatt cccatataag cgacctcttc cagcacgatg gcgttatgca 180
ccgcatcttc ggcatttttg ccccatgcaa acgggccgtg ggaatggacc agaacgccgg 240
gcatttgccg tgcattcgata ccctgttttt caaagggtttc tacgatgacg ttaccgggtt 300
cccactcata ttccgccgtt atttctgcgt cggtcatttt gcgggtgcag ggaatgggtg 360
cgtagaaata gtcggcgtgg gtggtgccgg ttgctggaat cgactgacct gcctgcgccc 420
agatggtggc gtggcgcgag tgcgtatgca caatgccgcc aatggagggg aatgcctgat 480
agagcagccg gtgagttggc gtgtcggagg agggcttttt cgtaccttca accacttcac 540
cggtttcgat gctaaccacg accatatcgt cagcggtcac gacgctgtaa tcgacgccgg 600
aaggtttgat cacaaagacg ccgcgctcgc gatcaacggc gctgacgttg ccccatgtga 660
gcgtgaccag gttgtgtttt ggcagcgcca gggtggcttc taatacctgg cgtttgagat 720
cttctaacat gttgactcct tcgtgccgga tgcgctttgc ttatccggcc tacaaaatcg 780
```

<210> 2

<211> 76

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 2

```
cgccatggtt ctcatgtttg acagcttatt atcgataagc tttaatgcgg tagtttagca 60
cgaaggagtc aacatg 76
```

<210> 3

<211> 64

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 3

```
cgccatggac tagtaaaaaa aagcccgtc attaggcggg ctgtcattac tgcccgtaat 60
atgc 64
```

<210> 4
<211> 81
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 4
cgccatggac tagttctcat gtttgacagc ttatcatcga taagctttaa tgcggtagtt 60
tagcacgaag gagtcaacat g 81

<210> 5
<211> 58
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 5
cgccatggaa aaaaaagccc gctcattagg cgggctgtca ttactgcccg taatatgc 58

<210> 6
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 6
gccagggttt tcccagtcac ga 22

<210> 7
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 7
gagcggataa caatttcaca cagg 24

<210> 8
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 8
ccaactcacc ggctgctcta tc 22

<210> 9
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
 <223> Primer

<400> 9
 aatgccgaag atgcggtgca taac 24

<210> 10
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 10
 taactgcggc gctaactgac 20

<210> 11
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 11
 ggttgctgga atcgactgac 20

<210> 12
 <211> 66
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 12
 ctcaaagcc caggtattag aagccaacct ggcgctgcca aaacacgtgt aggctggagc 60
 tgcttc 66

<210> 13
 <211> 60
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 13
 ggtttgatca caaagacgcc gcgctcgca tcaacggcgc attccgggga tccgtcgacc 60

<210> 14
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 14
 cggcacgaag gagtcaacat 20

<210> 15
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 15
 tgatagagca gccggtgagt 20

<210> 16
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 16
 tcagatcctt gccggcaaga 20

<210> 17
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 17
 tgtaatcgac gccggaaggt 20

<210> 18
 <211> 1030
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> 10E2BS-Promoter-RBS-araD-terminator

<400> 18
 ggatccgacc ggcaacggta cagatccgac cggcaacggg acagatccga ccggcaacgg 60
 tcagatccga ccggcaacgg tacagatccg accggcaacg gtacagatcc gaccggcaac 120
 ggtacagatc cgaccggcaa cggtagatc cggaccggca acggtacaga tccgaccggc 180
 aacggtagac atccgaccgg caacggtaga gatcccccta gcgaattgac tagttctcat 240
 gtttgacagc ttatcatcga taagctttaa tgcggtagtt tagcacgaag gagtcaacat 300
 gttagaagat ctcaaacgcc aggtattaga agccaacctg gcgctgccaa aacacaacct 360
 ggtagcgtc acatggggca acgtcagcgc cgtagatcgc gagcgcggcg tctttgtgat 420
 caaaccttcc ggcgtcgatt acagcgtcat gaccgctgac gatatggtcg tggttagcat 480
 cgaaaccggg gaagtgggtg aaggtacgaa aaagccctcc tccgacacgc caactcaccg 540
 gctgctctat caggcattcc cctccattgg cggcattgtg catacgcact cgcgccacgc 600
 caccatctgg gcgcaggcgg gtcagtcgat tccagcaacc ggcaccaccc acgcccacta 660
 tttctacggc accattccct gcacccgcaa aatgaccgac gcagaaatca acggcgaata 720
 tgagtgggaa accggtaacg tcacgtaga aacctttgaa aaacagggta tcgatgcagc 780
 gcaaatgcc ccggttctgg tccattccca cggcccgttt gcatggggca aaaatgccga 840
 agatgcgggtg cataacgcca tcgtgctgga agaggtcgct tatatgggga tattctgcgc 900

tcagtttagcg	ccgcagttac	cggatatgca	gcaaacgctg	ctggataaac	actatctgcg	960
taagcatggc	gcgaaggcat	attacgggca	gtaatgacag	cccgccta	gagcgggctt	1020
ttttttccat						1030

<210> 19
 <211> 696
 <212> DNA
 <213> Escherichia coli

<400> 19						
atgttagaag	atctcaaacg	ccaggtatta	gaagccaacc	tggcgctgcc	aaaacacaac	60
ctggtcacgc	tcacatgggg	caacgtcagc	gccgttgatc	gcgagcgcg	cgtctttgtg	120
atcaaaccct	ccggcgctga	ttacagcgtc	atgaccgctg	acgatatggt	cgtggtttagc	180
atcgaaaccg	gtgaagtggg	tgaaggtagc	aaaaagccct	cctccgacac	gccaactcac	240
cggctgctct	atcaggcatt	cccctccatt	ggcggcattg	tgcatacgca	ctcgcgccac	300
gccaccatct	gggcgcaggc	gggtcagtcg	attccagcaa	ccggcaccac	ccacgccgac	360
tattttctacg	gcaccattcc	ctgcacccgc	aaaatgaccg	acgcagaaat	caacggcgaa	420
tatgagtggg	aaaccggtaa	cgtcatcgta	gaaacctttg	aaaaacaggg	tatcgatgca	480
gcgcaaatac	ccggcgcttc	gggtccattcc	cacggcccgt	ttgcatgggg	caaaaatgcc	540
gaagatgcgg	tgcataacgc	catcgtgctg	gaagaggctg	cttatatggg	gatattctgc	600
cgtcagttag	cgccgcagtt	accggatatg	cagcaaacgc	tgctggataa	acactatctg	660
cgtaagcatg	gcgcgaaggc	atattacggg	cagtaa			696

<210> 20
 <211> 687
 <212> DNA
 <213> Escherichia coli

<400> 20						
atgcaaaagc	taaaacagca	ggtatttgaa	gccaacatgg	agctgccgcg	ctacgggctg	60
gtgaccttta	cctggggcaa	cgtcagcgct	atcgaccgcg	aacgcgggct	ggtgggtgatc	120
aagcccagcg	gcgttgccca	cgaaaccatg	aaagcggccg	atatggtggt	ggttgatatg	180
agcggcaagg	tggtggaagg	ggagtatcgc	ccatcttccg	acactgacac	gcactctcgaa	240
ctctaccgtc	gttacccgct	gcttggtggc	attgtccata	cccactccac	tcatgccacc	300
gcatgggcgc	aggcggggct	ggcgatcccg	gcgttaggca	ccacgcacgc	cgactacttc	360
tttggcgaca	ttccgtgtac	gcgcgggtta	agcgaagaag	aggtgcaggg	cgagtatgaa	420
ctgaacaccg	gcaaagtgat	tatcgaaacg	ctgggcaacg	ccgagccgct	gcatacgccg	480
ggaattgtgg	tgtatcagca	cgggccgttc	gcctggggga	aagatgctca	cgatgcggtg	540
cataacgcgg	tggtgatgga	agaagtggcg	aaaatggcgt	ggattgcccg	cggcattaac	600
ccacaactca	atcacatcga	cagcttctct	atgaataaac	acttcatgcg	taaacacggg	660
cctaacgcct	attacgggca	gaagtag				687

<210> 21
 <211> 65
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 21						
cagcaggtat	ttgaagccaa	catggagctg	ccgcgctacg	ggctggtgta	ggctggagct	60
gcttc						65

<210> 22
 <211> 66
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 22
aaacggctgc ggaattagac cagttatctc ccgaggaagg aaattaattc cggggatccg 60
tcgacc 66

<210> 23
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 23
aaacggctgc ggaattagac c 21

<210> 24
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 24
gccgtacctg attgagatgt ggag 24

<210> 25
<211> 696
<212> DNA
<213> Escherichia coli

<400> 25
atgttagagc aactgaaagc cgacgtgotg gcggcgcaatc tggcgcttcc cgctcaccat 60
ctgggtgacgt tcacctgggg caatgtcagc gcggtagacg aaacgcggca atggatggta 120
atcaaaccctt ccggcgctga gtacgacgtg atgaccgccg acgatatggg ggtgggttgag 180
atagccagcg gtaagggtgt ggaaggcagc aaaaaaccct cttccgatac accaacgcat 240
ctggcgctct accgtcgcta tgccgaaatt ggcggtattg tgcataccca ctgcgcgccac 300
gccaccatct ggtcacaggc cgggctggat ctccccgcct ggggcaccac ccacgccgat 360
tattttttacg gtgccatccc ctgcacgcga cagatgaccg cagaggagat taacggcgaa 420
tatgaatatc agaccggcga agtgatcatt gaaaccttcg aagaacgtgg caggagtccg 480
gcacaaatcc cggcggtgct ggtgcattct cacggcccgt tcgcatgggg taaaaacgcc 540
gccgatgccg tgcataacgc cgtagtactc gaagaatgcg cctatatggg tctattctcg 600
cgccagcttg cgccgcagct ccctgcgatg caaaacgaac tgctggataa gcactacctg 660
cgtaagcatg gggccaatgc ctattacggg cagtaa 696

<210> 26
<211> 67
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 26
cgttacagca aggaacatat caattcgtag tgccggggcg atgaagaatt ccgggggatcc 60
gtcgacc 67

<210> 27
<211> 65
<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 27

gcaggaggct ggatttatat gttagagcaa ctgaaagccg acgtggtgta ggctggagct 60
gcttc 65

<210> 28

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 28

cggcgttaca gcaaggaaca tatic 24

<210> 29

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 29

attgaagcgc gtatgcagga gg 22

<210> 30

<211> 901

<212> DNA

<213> Escherichia coli

<400> 30

ataaactgaa ctatcgcggt tctttcctga ttgagatgtg gaccgaaaaa gccaaagagc 60
cgggtgctgga gattattcag gcgcggcggt ggattgaagc gcgtatgcag gagggctggat 120
ttatatgtta gagcaactga aagccgacgt gctggcgcg aatctggcgc tccccgctca 180
ccatctggtg acgttcacct ggggcaatgt cagcgcggtg gacgaaacgc ggcaatggat 240
ggtaaatcaaa ccttccggcg tcgagtacga cgtgatgacc gccgacgata tgggtggtggt 300
tgagatagcc agcggtaagg tgggtggaagg cagcaaaaaa ccctcttccg atacaccaac 360
gcatctggcg ctctaccgtc gctatgccga aattggcggt attgtgcata cccactcgcg 420
ccacgccacc atctggtcac aggccggggt ggatctcccc gcctggggca ccaccacgc 480
cgattatattt tacggtgcc accccctgcac gcgacagatg accgcagagg agattaacgg 540
cgaatatgaa tatcagaccg gcgaagtgat cattgaaacc ttcgaagaac gtggcaggag 600
tccggcacia atccccggcg tgctggtgca ttctcacggc ccgttcgcat ggggtaaaaa 660
cgccgccgat gccgtgcata acgccgtagt actcgaagaa tgcgcctata tgggtctatt 720
ctcgcgccag cttgcgccgc agtccctgc gatgcaaaac gaactgctgg ataagcacta 780
cctgcgtaag catggggcca atgcctatta cgggcagtaa tccctcacgc cggggcttca 840
tcgccccggc actacgaatt gatatgttcc ttgctgtaac gccgcttcca cgctgctggc 900
g 901

<210> 31

<211> 231

<212> PRT

<213> Escherichia coli

<400> 31

Met Leu Glu Gln Leu Lys Ala Asp Val Leu Ala Ala Asn Leu Ala Leu

1		5		10		15									
Pro	Ala	His	His	Leu	Val	Thr	Phe	Thr	Trp	Gly	Asn	Val	Ser	Ala	Val
		20						25				30			
Asp	Glu	Thr	Arg	Gln	Trp	Met	Val	Ile	Lys	Pro	Ser	Gly	Val	Glu	Tyr
	35					40						45			
Asp	Val	Met	Thr	Ala	Asp	Asp	Met	Val	Val	Val	Glu	Ile	Ala	Ser	Gly
	50				55						60				
Lys	Val	Val	Glu	Gly	Ser	Lys	Lys	Pro	Ser	Ser	Asp	Thr	Pro	Thr	His
	65				70				75						80
Leu	Ala	Leu	Tyr	Arg	Arg	Tyr	Ala	Glu	Ile	Gly	Gly	Ile	Val	His	Thr
			85					90						95	
His	Ser	Arg	His	Ala	Thr	Ile	Trp	Ser	Gln	Ala	Gly	Leu	Asp	Leu	Pro
	100							105				110			
Ala	Trp	Gly	Thr	Thr	His	Ala	Asp	Tyr	Phe	Tyr	Gly	Ala	Ile	Pro	Cys
	115					120						125			
Thr	Arg	Gln	Met	Thr	Ala	Glu	Glu	Ile	Asn	Gly	Glu	Tyr	Glu	Tyr	Gln
	130				135						140				
Thr	Gly	Glu	Val	Ile	Ile	Glu	Thr	Phe	Glu	Glu	Arg	Gly	Arg	Ser	Pro
	145				150				155						160
Ala	Gln	Ile	Pro	Ala	Val	Leu	Val	His	Ser	His	Gly	Pro	Phe	Ala	Trp
			165					170						175	
Gly	Lys	Asn	Ala	Ala	Asp	Ala	Val	His	Asn	Ala	Val	Val	Leu	Glu	Glu
		180						185					190		
Cys	Ala	Tyr	Met	Gly	Leu	Phe	Ser	Arg	Gln	Leu	Ala	Pro	Gln	Leu	Pro
	195						200					205			
Ala	Met	Gln	Asn	Glu	Leu	Leu	Asp	Lys	His	Tyr	Leu	Arg	Lys	His	Gly
	210					215					220				
Ala	Asn	Ala	Tyr	Tyr	Gly	Gln									
225					230										

<210> 32
 <211> 901
 <212> DNA
 <213> Escherichia coli

<400> 32
 cggggccgtac ctgattgaga tgtggagcga aacggcgga gacccggcgg cagaagtggc 60
 gaaagcgcgt gattgggtga aagcgcgcat ggcgaaagcg ggcattggtg aggcggcata 120
 atgcaaaagc taaaacagca ggtatttgaa gccaacatgg agctgcccg ctacgggctg 180
 gtgaccttta cctggggcaa cgtcagcgct atcgaccgag aacgcgggct ggtggtgatc 240
 aagcccagcg gcgttgccca cgaaaccatg aaagcggccg atatggtggt ggttgatatg 300
 agcggcaagg tgggtggaagg ggagtatcgc ccatcttccg acactgcgac gcatctcgaa 360
 ctctaccgtc gttaccgcgc gcttggtggc attgtccata cccactccac tcatgccacc 420
 gcatggggcg aggcggggct ggcgatcccg gcgttaggca ccacgcacgc cgactacttc 480
 tttggcgaca ttccgtgtac gcgcgggtta agcgaagaag aggtgcaggg cgagtatgaa 540
 ctgaacaccg gcaaagtgat tatcgaaacg ctgggcaacg ccgagccgct gcatacgccg 600
 ggaattgtgg tgtatcagca cgggccgttc gcctggggga aagatgctca cgatgcggtg 660
 cataacgcgg tgggtgatgga agaagtggcg aaaatggcgt ggattgcccg cggcattaac 720
 ccacaactca atcacatcga cagcttcctg atgaataaac acttcatgcg taaacacggg 780
 cctaacgctt attacgggca gaagtagaac acgcgctgcg gaaatttcct tcctcgggag 840
 ataactggtc taattccgca gccgtttttc aaaaaaaagc cccctgcgaa gggggcaaaag 900
 c

<210> 33
 <211> 228
 <212> PRT
 <213> Escherichia coli

<400> 33
 Met Gln Lys Leu Lys Gln Gln Val Phe Glu Ala Asn Met Glu Leu Pro

1				5					10					15		
Arg	Tyr	Gly	Leu	Val	Thr	Phe	Thr	Trp	Gly	Asn	Val	Ser	Ala	Ile	Asp	
			20					25					30			
Arg	Glu	Arg	Gly	Leu	Val	Val	Ile	Lys	Pro	Ser	Gly	Val	Ala	Tyr	Glu	
		35					40					45				
Thr	Met	Lys	Ala	Ala	Asp	Met	Val	Val	Val	Asp	Met	Ser	Gly	Lys	Val	
	50				55					60						
Val	Glu	Gly	Glu	Tyr	Arg	Pro	Ser	Ser	Asp	Thr	Ala	Thr	His	Leu	Glu	
65				70					75					80		
Leu	Tyr	Arg	Arg	Tyr	Pro	Ser	Leu	Gly	Gly	Ile	Val	His	Thr	His	Ser	
			85					90					95			
Thr	His	Ala	Thr	Ala	Trp	Ala	Gln	Ala	Gly	Leu	Ala	Ile	Pro	Ala	Leu	
			100					105					110			
Gly	Thr	Thr	His	Ala	Asp	Tyr	Phe	Phe	Gly	Asp	Ile	Pro	Cys	Thr	Arg	
	115					120						125				
Gly	Leu	Ser	Glu	Glu	Glu	Val	Gln	Gly	Glu	Tyr	Glu	Leu	Asn	Thr	Gly	
	130					135					140					
Lys	Val	Ile	Ile	Glu	Thr	Leu	Gly	Asn	Ala	Glu	Pro	Leu	His	Thr	Pro	
145				150					155						160	
Gly	Ile	Val	Val	Tyr	Gln	His	Gly	Pro	Phe	Ala	Trp	Gly	Lys	Asp	Ala	
			165					170						175		
His	Asp	Ala	Val	His	Asn	Ala	Val	Val	Met	Glu	Glu	Val	Ala	Lys	Met	
			180					185					190			
Ala	Trp	Ile	Ala	Arg	Gly	Ile	Asn	Pro	Gln	Leu	Asn	His	Ile	Asp	Ser	
	195					200						205				
Phe	Leu	Met	Asn	Lys	His	Phe	Met	Arg	Lys	His	Gly	Pro	Asn	Ala	Tyr	
	210					215					220					
Tyr	Gly	Gln	Lys													
225																

<210> 34

<211> 231

<212> PRT

<213> Escherichia coli

<400> 34

Met	Leu	Glu	Asp	Leu	Lys	Arg	Gln	Val	Leu	Glu	Ala	Asn	Leu	Ala	Leu	
1				5				10					15			
Pro	Lys	His	Asn	Leu	Val	Thr	Leu	Thr	Trp	Gly	Asn	Val	Ser	Ala	Val	
			20					25					30			
Asp	Arg	Glu	Arg	Gly	Val	Phe	Val	Ile	Lys	Pro	Ser	Gly	Val	Asp	Tyr	
		35				40						45				
Ser	Val	Met	Thr	Ala	Asp	Asp	Met	Val	Val	Val	Ser	Ile	Glu	Thr	Gly	
	50				55						60					
Glu	Val	Val	Glu	Gly	Thr	Lys	Lys	Pro	Ser	Ser	Asp	Thr	Pro	Thr	His	
65				70					75					80		
Arg	Leu	Leu	Tyr	Gln	Ala	Phe	Pro	Ser	Ile	Gly	Gly	Ile	Val	His	Thr	
			85					90					95			
His	Ser	Arg	His	Ala	Thr	Ile	Trp	Ala	Gln	Ala	Gly	Gln	Ser	Ile	Pro	
			100					105					110			
Ala	Thr	Gly	Thr	Thr	His	Ala	Asp	Tyr	Phe	Tyr	Gly	Thr	Ile	Pro	Cys	
		115				120						125				
Thr	Arg	Lys	Met	Thr	Asp	Ala	Glu	Ile	Asn	Gly	Glu	Tyr	Glu	Trp	Glu	
	130				135						140					
Thr	Gly	Asn	Val	Ile	Val	Glu	Thr	Phe	Glu	Lys	Gln	Gly	Ile	Asp	Ala	
145				150					155					160		
Ala	Gln	Met	Pro	Gly	Val	Leu	Val	His	Ser	His	Gly	Pro	Phe	Ala	Trp	
			165					170						175		
Gly	Lys	Asn	Ala	Glu	Asp	Ala	Val	His	Asn	Ala	Ile	Val	Leu	Glu	Glu	
			180					185					190			

Val Ala Tyr Met Gly Ile Phe Cys Arg Gln Leu Ala Pro Gln Leu Pro
195 200 205
Asp Met Gln Gln Thr Leu Leu Asp Lys His Tyr Leu Arg Lys His Gly
210 215 220
Ala Lys Ala Tyr Tyr Gly Gln
225 230